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1887-88

REPORT
OF THE
BOARD OF COMMISSIONERS
OF THE
GEOLOGICAL SURVEY OF PENNSYLVANIA,

To the Legislature, January 16, 1889

rept. for 1887-88

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REPORT
OF THE
BOARD OF COMMISSIONERS
OF THE
GEOLOGICAL SURVEY OF PENNSYLVANIA,
FOR 1887 AND 1888.

*To the Honorable Senate and House of Representatives of
Pennsylvania :*

The Board of Commissioners of the Geological Survey of Pennsylvania respectfully present the following report.
January 16, 1889 :

The act of 14th June, 1887, appropriated eighty-eight thousand dollars to the Geological Survey, with the proviso, "That the sum hereby appropriated shall fully complete, by June first, one thousand eight hundred and eighty-nine, the anthracite coal-field and the entire geological surveys up to date."

This injunction of the Legislature was fully considered by the Board at a meeting called for that purpose immediately after the passage of the act. Grave doubts were felt in regard to the possibility of completing the Anthracite Survey for the sum and within the time limited, but it was decided to make the attempt.

The meaning of the proviso was not clear. If it meant that both field-work and office-work should stop at the date named, and no money should be paid out of the appropriation after that date, the practical effect would be to stop all field-work some time in the fall of 1888, and then em-

ploy the whole force in preparing and publishing the results up to June 1, 1889, with the certainty that the publication would not be entirely finished at that time. If this construction were to be placed on the act, compliance with its requirements would be impossible.

But if the words of the proviso, "fully completing the anthracite coal-field, etc.," meant completing the field-work, leaving whatever funds were unexpended on June 1, 1889, applicable to preparation and publication, then it seemed possible to accomplish what the Legislature wished. In this doubt it was decided to obtain the opinion of the Attorney General on the meaning of the proviso. This opinion was in substance that the field-work could be carried on up to June 1, 1889, and that so much of the appropriation as then remained unexpended could be applied to preparing the results of the previous work for publication, and to its oversight while passing through the press. In this way the State would obtain the largest possible return for the money appropriated.

Governed by these views, the Board, with the assistance of the State Geologist, modified the plans of the survey in several directions by cutting off some things otherwise desirable, by reducing the amount of topographical work in the anthracite district, and so arranging the whole survey that the final result, while not entirely satisfactory in every part of the State, would still leave no glaring deficiencies.

In this their efforts have been seconded by the whole corps.

The Anthracite Survey has been diligently prosecuted for the last sixteen months, and will be finished on the modified plan at the time appointed by the Legislature, June 1, 1889; but the publication of its last sheets and descriptions must necessarily take a longer time.

The field-work of its northern field, of its eastern and western middle fields, and of its southern field is entirely finished.

The office-work of its northern and western middle fields is nearly finished. That of the eastern middle field will occupy the entire winter, and that of its southern field, the

winter and spring—in fact, will be extended to the last day at our command.

By that time there will have been constructed eighty sheets showing the underground colliery workings; thirty-six sheets filled with columnar sections of coal-beds, etc.; thirty-six sheets of vertical cross-sections, showing the rise and fall of the coal-beds from side to side of each basin, along many lines at right angles to the strike of the beds; and numerous sheets of topographical contour lines, showing the hills, valleys, streams, roads, railroads, towns, colliery-buildings, dwelling-houses, etc., on the surface; about one hundred and seventy sheets in all.

All the anthracite fields will have received precisely the same treatment, so far as mine sheets and columnar section sheets are concerned. But it will be impossible to furnish for publication in the time allowed and with the appropriation made, topographical maps of the eastern middle and southern fields similar to those of the northern and western middle fields. Nor will it be possible to provide more than a few cross-section sheets of the southern field, because this kind of work is of a nature requiring all the other kinds to be finished first. The estimate of the Board included this; but when the appropriation was made subject to the above mentioned proviso, it was distinctly stated by the State Geologist that this part of the Anthracite Survey would have to be omitted. To do it would require nine months more, and an outlay of fifteen thousand dollars—that is, the present efficient corps would have to continue its field and office-work after June 1, 1889, six months, and its office-work three months longer—to March 1, 1890.

In middle Pennsylvania, the four counties of which full reports were wanting, Union, Snyder, Mifflin and Juniata, have been surveyed and geological maps prepared.

Geological maps of Schuylkill and Carbon will be finished this winter.

Geological maps of Cambria and Somerset have been made, and a report will be published supplementing and bringing up to date the geological reports on these two

counties, made in 1875-76. This supplies the only deficiency in the series of our reports in western Pennsylvania.

The survey of the Oil and Gas regions has been carried on as directed by the Legislature, and a report of it will be published.

A revised map of western Pennsylvania has been prepared, showing the locations of all bituminous and semi-bituminous mines west of a meridian through Potter county, and including Broad Top. Notes on the present condition and work of all mines, old and new, to be published in one volume, will accompany this map.

In south-eastern Pennsylvania, a reproduction of the Philadelphia Water Department map of the water-basins of Bucks and Montgomery counties has been published in an atlas of twelve sheets, on a reduced scale; and on the basis of this map the geological survey of the New Red belt has been prosecuted, a report of which will be published.

The Broad Top Coal field of eighty square miles, for which we have long had large materials, to the extent of about one-half of the area, still remains to be done. It would be of no real use unless it were done in the same mode as the survey of the anthracite fields, and for this the appropriation of 1887 was not sufficient.

A report on the Fossils of Pennsylvania, arranged alphabetically, making a volume of about eight hundred pages, with over two thousand figures, has been prepared by the State Geologist, and is going through the press. It is not intended for the use of geologists, but for the convenience of the citizens of the State, especially quarrymen, mining engineers, division railroad engineers, and school teachers, in districts where fossil forms are common, or may be sought for with success.

The Summary description of the geology of the State, or Final report of the State Geologist, is in a state to put to press whenever the pressure of other duties will permit. The Fossil Dictionary is, in fact, a part of it.

A final volume of Dr. Lesquereux's *Coal Flora of Pennsylvania* is in preparation, with about one hundred new species, many of them plants of Devonian age from the Wy-

oming county quarries. It will be ready for publication in the spring.

But it has been impossible to make collections of fossils from the Upper Coal Measures of south-western Pennsylvania, from the Pittsburgh roof shales upward into the Permian strata of Greene county ; and until such collections are made the plant and animal life of that interesting pile of formations will remain but little known.

Neither did the appropriation suffice for collections in the Trias, or New Red belt of Lancaster, York and Adams counties, in which bones and foot prints, as well as plants, are known to exist.

The work of making microscopic slides of our crystalline rocks, and of the different limestones of the State, which was begun two years ago, has had to be laid aside, because it was impossible to divert the necessary funds from the planned work of the Survey.

A Geological State Map will, no doubt, be made, and will be a great improvement on the State Geological Map of 1858 ; but no State Map worthy of so great a Commonwealth can be made without special appropriations by the Legislature for extensive trigonometrical and vernier transit surveys, the establishment of all county line-corners, and the astronomical location of county seats, with telegraphic meridian observations to bind all local surveys together in a true and general system.

The Board would earnestly recommend that the cessation of the Geological Survey should not terminate the connection of the State with geological work. There are new discoveries continually being made of valuable deposits of minerals which are of public interest, and these ought to be examined and reported on annually by a public official as is now done in New Jersey and many other States.

The extension of the United States Coast Survey triangulation work across the State, and of the United States Geological Survey topographical work, should be encouraged and assisted by State action under the supervision of a competent official, as has been done with such excellent results in Massachusetts and in New Jersey. This would

afford a basis for an accurate State Map, which we do not now possess.

A moderate annual appropriation would secure the services of a first-class geologist, with one or two assistants, who could keep the geology of the State worked up to date, oversee a topographical survey and prepare annual reports which would be interesting and valuable.

The Board would repeat their recommendation that provision should be made for the display of our invaluable collection of geological specimens under the care of a custodian competent to explain them to students. Such an exhibition would constitute a school of geology almost unrivaled.

At present these costly collections, though boxed, labeled, and catalogued, are stored away in an inaccessible place, and are of no use to anybody.

If the State Capital is enlarged, a suite of rooms in the new building should be provided for this purpose.

If not, a moderate appropriation to the building fund of that most deserving institution, the Academy of Natural Sciences, in Philadelphia, would enable the Academy to erect a building suitable for the purpose, and they would provide a curator without charge to the State. The Academy has consented to take charge of the boxes containing the specimens without cost to the State, but has no room to display them.

WILLIAM A. INGHAM,
Secretary of Board.



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